

Remarks

Claims 1-4 and 6-11 are pending herein. Claims 10 and 11 have been withdrawn as being directed to a non-elected invention. By this Amendment, claims 1, 3 and 7 have been amended, and claim 5 has been canceled.

Claim 1 has been amended to include the following recitation:

wherein a second groove is formed in a part of a portion, opposing the flanged part, of the lower surface of the substrate holding table, whereby the flanged part is joined to the lower surface of the substrate holding table at an outermost annular area of an upper surface of the flanged part, while a remaining area of the upper surface of the flanged part located radially inside the outermost annular area is separated from the substrate holding part by a space provided by the second groove opposing the flanged part.

Support for the recitation added to claim 1 can be found, e.g., in canceled claim 5, and in Figure 7.

Claim 3 has been amended to overcome a rejection under 35 U.S.C. §112, discussed below.

Claim 7 has been amended to overcome an objection thereto, discussed below.

In the Office Action, the drawings are objected to; claims 5 and 7 are objected to on separate grounds; claims 3 and 5-7 are rejected under 35 U.S.C. §112, second paragraph; claims 1-3, 5, 8 and 9 are rejected under 35 U.S.C. §102(b) as being anticipated by JP 2000-021957 to Yoshida; claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over Yoshida in view of JP 2004-022382 to Goto et al (“Goto”); claim 6 is rejected under §103(a) as being unpatentable over Yoshida in view of JP 11-354526 to Watanabe et al. (“Watanabe”); and claim 7 is rejected under §103(a) as being unpatentable over Yoshida and Watanabe as applied to claim 6 and further in view of U.S. Patent No. 6,215,643 to Nagasaki.

In view of the amendments and remarks herein, Applicants respectfully request reconsideration and withdrawal of the objections and rejections set forth in the Office Action.

I. Objection to the Drawings

The drawings are objected to because the connections between the heater and power supply patterns are alleged as unclear with respect to Figures 4-6. No changes are proposed to the original drawings hereby. Rather, the objection is overcome by the original drawings, with the benefit of the following comments.

Figs. 4-6 actually are clear in showing the structure of the heating apparatus for table 23A, and the power line connection thereto. However, a rather careful review is necessary to completely appreciate this structure. Fig. 4 is a side view of the table. Fig. 5 shows the upper heater structure referred to as inner heater pattern 24A and outer heater pattern 24B. The structure below patterns 24A and 24B is shown in Fig. 6. This is a composite structure 24C. Now, with respect to Fig. 4, power supply line 23a connects to inner pattern 24A at the connection points 23a and 23a', shown in Fig. 5. As shown in Fig. 5, there are semicircular cutouts 24c in inner pattern 24A, however, these do not prevent all of pattern 24A from being energized by power supplied through line 23a. The gaps between annular sections of inner pattern 24A in Fig. 4 correspond to cutouts 24c in Fig. 5. Despite the cutouts/gaps 24c, close inspection of Fig. 5 shows that there is electrical continuity across all of inner pattern 24A, via its connection to line 23a at points 23a and 23a'. See specification paragraphs [0028] and [0029].

The structure for outer pattern 24b is similar, except for the intervening presence of the semicircular conductive supply patterns together known as 24C. As discussed in paragraph [0031], supply line 23b connects to patterns 24C₁ and 24C₂ at connection points 23d and 23d' to energize the patterns. Patterns 24C₁ and 24C₂, in turn, are connected to outer pattern 24B above them by connection points 23c and 23c'. Both connection points 23c and 23c' are shown in Figs. 5 and 6. Due to the cross sectional view in Fig. 4, only one such point is visible at the left, connecting the left most portion of outer pattern 24B with the left most portion of supply pattern 24C. Again, as seen from Fig. 5, outer pattern 24B is continuous, even with the presence of cutouts 24c. Therefore, even though it may not be apparent from Fig. 4 alone, there is in fact complete connection from line 23b to the entirety of outer pattern 24B via power supply pattern 24C (consisting of semicircular patterns 24C₁ and 24C₂) and connection points 23c and 23c'.

In view of the foregoing, it courteously is urged that the power connection to all heater elements indeed is shown by Figs. 4-6. It is important to consider Figs. 4-6 as a group in order to fully understand the current path from supply lines 23a and 23b to the inner and outer patterns 24A and 24B respectively. Withdrawal of the objection to these drawings courteously is solicited.

II. Objections to Claims 5 and 7

Claim 5 is objected to because the term “holing” at line 4 should be “holding”. Claim 5 has been canceled.

Claim 7 is objected to because the phrase “first and” should be added before the term “second drive”. Claim 7 has been amended to clarify that the conductive patterns are connected only to the second power supply line constituting the second drive power supply system.

Applicants respectfully request that the objections be withdrawn.

III. Rejection of Claims 3 and 5-7 Under §112

Claims 3 and 5-7 are rejected under §112, second paragraph, as being indefinite.

Regarding claim 3, the term “within a range” is said to render the claim indefinite. Claim 3 has been amended to replace the language “within a range corresponding to” with --so as to be connected to--. Applicants submit that claim 3, as amended, is not indefinite.

Claim 5 has been canceled.

As to claims 6 and 7, the Office Action states that the connections between the heating mechanism parts, conductive patterns, and power supply lines are unclear because the Figures and specification seem to show that the heating mechanisms and conductive patterns are connected to the power supply lines and each other. This objection also is traversed. The reasons for traversal are very similar to those given above in connection with Figs. 4-6.

Initially, the undersigned believes that original claim 7 contained an error. This error would have complicated analysis of Applicants’ Figs. 4-6 and claims 6 and 7. The understood error in claim 7 has been corrected by the amendment thereto. Otherwise, to ensure full appreciation of claims 6 and 7, correspondence between these claims and Applicants’ exemplary, preferred embodiment shown in Figs. 4-6 will be discussed below.

The “inner heating-mechanism part” of claim 6 reads on inner heater pattern 24A. Accordingly, the “outer heating-mechanism part” corresponds to outer heater pattern 24B. These “parts” are driven by a “first and second” power drive system. This reads on inner supply line 23a connected to inner pattern 24A, and outer supply line 23b connected to outer pattern 24B (via power supply pattern 24C). The supply lines 23a and 23b, of course, extend within support column 23A. This covers claim 6.

When we move to claim 7, it is apparent that the recited “first and second semicircular conductive patterns which are arranged below the heating mechanism” reads on the two semicircular patterns 24C₁ and 24C₂ shown in Fig. 6 that make up power supply pattern 24C. These are connected and supplied with power by line 23b. They indeed “substantially cover a whole area of the substrate holding table,” except for the separation gap between them.

In view of the original disclosure, the amendment to claim 7, and the explanations above, it courteously is urged that claims 6 and 7 likewise fully comply with all of the requirements of 35 U.S.C. § 112. Hence, the rejection as applied to these claims also should be withdrawn.

IV. Rejection of Claims 1-3, 5, 8 and 9 Under §102(b)

Claims 1-3, 5, 8 and 9 are rejected under §102(b) as being anticipated by Yoshida.

Claim 5 has been canceled. Claims 1 and 9 are independent. Claims 2, 3 and 8 depend directly or indirectly upon claim 1. The apparatus set forth in claim 9 includes the substrate holding structure recited in claim 1.

Applicants submit that claims 1-3, 8 and 9 are not anticipated by Yoshida.

Claim 1 has been amended in part to include the contents of canceled claim 5. According to the Office Action, Yoshida is cited for teaching a groove formed in a part of a portion, opposing the flanged part, of the lower surface of the substrate holding table (see, e.g., Figures 4 and 6). In addition, Yoshida is cited for teaching that the flanged part is joined to the lower surface of the substrate holding table only at an outermost annular area thereof (see, e.g., Figures 1 and 4).

Applicants submit that Yoshida does not teach or suggest the following feature of amended claim 1: “the remaining area of the upper surface of the flanged part located radially

inside the outermost annular area is separated from the substrate holding table by a space provided by the groove (232) opposing the flanged part”.

According to the instant specification:

An annular groove 232 is formed in the lower surface 231 of the substrate holding table 23. The depth of the groove 232 need not be so large, and may be about 1 mm. Due to the provision of the groove 232, a gap is defined between an upper surface 234 of the flanged part 23B of the support column 23A and the substrate holding table 23, so that the area of the joint surface 235 between the substrate holding table 23 and the support column 23A is reduced. As a large temperature difference exists between the substrate holding table 23 with a built-in heating mechanism and the support column 23A without including any heating mechanism, if the area of the joint surface 235 is too large, thermal stress induced in the vicinity of the joint surface 235 becomes larger. In addition, if the area of the joint surface 235 is too large, the calorific value flowing from the substrate holding table 23 to the support column 23A becomes large, deteriorating the temperature uniformity of the substrate holding table 23. In order to avoid such problems, the width of the joint surface 235 is set to be a value (e.g., 4 mm) as small as possible, as long as sufficient joint strength between the substrate holding table 23 and the support column 23A can be ensured. Note that the U-shaped groove 23U and the annular groove 232 are formed by grinding the flat lower surface 231 of the substrate holding table 23 arranged in a single horizontal plane. The joint surface 235 is positioned outside a cylinder which is coaxial with the support column 23A and has a diameter equal to the diameter d of the support column 23A. [emphasis added] (paragraph [0037]).

Applicants caution that aspects of the drawings of Yoshida are difficult to understand. For example, Yoshida discloses that the horizontally-elongated area without hatching (designated by reference numeral 10 and located between the disk-shaped ceramic heater 2 and support 12) is a joint which is typically formed of a ceramic material. In Yoshida, unlike the present invention, there is no gap between the upper end face of the support 12 and the bottom face of the disk-shaped ceramic heater 2. Thus, in Yoshida, the whole upper end surface of the support 12 is joined to the bottom face of the disk-shaped ceramic heater 2.

Therefore, for at least the reasons given above, Applicants respectfully submit that claims 1-3, 8 and 9 are not anticipated by Yoshida.

V. Rejection of Claim 4 Under §103(a)

Claim 4 is rejected under §103(a) as being unpatentable over Yoshida in view of Goto.

Claim 4 depends upon claim 1 and, therefore, includes the features added thereto by this Amendment. Thus, claim 4 is patentable over Yoshida for at least the same reason claim 1 is patentable over Yoshida, i.e., Yoshida does not teach or suggest the following feature of amended claim 1: “the remaining area of the upper surface of the flanged part located radially inside the outermost annular area is separated from the substrate holding table by a space provided by the groove (232) opposing the flanged part”. Goto does not cure Yoshida’s failure to teach this feature.

Therefore, Applicants respectfully submit that claim 4 is patentable over Yoshida in view of Goto.

VI. Rejection of Claim 6 Under §103(a)

Claim 6 is rejected under §103(a) as being unpatentable over Yoshida in view of Watanabe.

Claim 6 depends upon claim 1. Therefore, Applicants submit that claim 6 is patentable over Yoshida for at least the same reason that claim 1 is patentable over this reference, i.e., Yoshida does not teach or suggest the following feature of amended claim 1: “the remaining area of the upper surface of the flanged part located radially inside the outermost annular area is separated from the substrate holding table by a space provided by the groove (232) opposing the flanged part”. Watanabe does not cure Yoshida’s failure to teach this feature.

Therefore, Applicants respectfully submit that claim 6 is patentable over Yoshida in view of Watanabe.

VII. Rejection of Claim 7 Under §103(a)

Claim 7 is rejected under §103(a) as being unpatentable over Yoshida and Watanabe in view of Nagasaki.

Claim 7 depends indirectly upon claim 1, and, therefore, is patentable over Yoshida for at least the same reason that claim 1 is patentable over this reference. Watanabe and Nagasaki do

not cure Yoshida's failure to teach the feature of "the remaining area of the upper surface of the flanged part located radially inside the outermost annular area is separated from the substrate holding table by a space provided by the groove (232) opposing the flanged part".

Therefore, for at least this reason, Applicants respectfully submit that claim 7 is patentable over Yoshida and Watanabe in view of Nagasaki.

VIII. Conclusion

In view of the amendments and remarks herein, Applicants respectfully request that the objections and rejections set forth in the Office Action be withdrawn and that claims 1-4 and 6-9 be allowed.

If any fees under 37 C. F. R. §§ 1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300, Order No. 033082M301.

Respectfully submitted,
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